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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,762

08/17/2006

Jun Yamada

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EXAMINER

NELSON, MICHAEL B

ART UNIT

PAPER NUMBER

1794

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DELIVERY MODE

11/19/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,762	<b>Applicant(s)</b> YAMADA ET AL.	
	<b>Examiner</b> MICHAEL B. NELSON	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 9-14, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 9-14, 18 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed on 10/17/2008 has been entered. Claims 2-5 have been cancelled and claims 1, 9-14, 18 and 19 are currently under examination on the merits.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 9-12, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyobo Co Ltd (JP 07100201), see Schreiber Translation Inc. English Translation (NPL Document U), with evidentiary support from Deshpande et al. (U.S. 2003/0215644).

Regarding claims 1 and 9, Toyobo Co Ltd discloses a porous membrane ([0004]), with a thickness of between 5 and 100 micrometers ([0013]), and a viscosity of greater than 0.5 dl/g ([0010], L16-19) with instant chemical formula (I) ([0010]) being present at more than 20mol% ([0010], L6). Toyobo Co Ltd is silent as to the glass transition temperature of the polyamideimide resin used in the porous membrane, however, one having ordinary skill in the art would have adjusted, through routine experimentation, the glass transition temperature of the resin in order to optimize the rheological and mechanical properties of the final membrane. Toyobo Co Ltd is also silent as to amide/imide bond ratio (recited in instant claim 9), however, it was known to those having ordinary skill in the art at the time of the invention that the ratio of amide to imide bonds in a polyamide imide resin affects the moisture stability, cost, dielectric constant and solubility in polar solvents of the final product (See Deshpande et al., [0054], for evidence of controllability of imide/amide ratio, and [0072]-[0073], for the corresponding effects). Hence, one having ordinary skill would have adjusted, through routine experimentation, the amide/imide bond ratio in order to optimize the moisture stability of the final product.

Regarding claims 2-3 and 10-12, Toyobo Co Ltd. discloses all of the limitations as set forth above. Additionally, the reference discloses the membrane alone and with no other layers

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(i.e. a monolayer). Toyobo Co Ltd also discloses that the polyamide imide resin comprises an acid component including dimer acid ([0011]) and biphenyltetracarboxylic acid anhydride ([0006]).

Regarding claims 18 and 19, modified Toyobo Co Ltd. discloses all of the limitations as set forth above. Additionally, Toyobo Co Ltd. discloses that diisocyanate (which is a diamine according to the instant specification on page 7 lines 18-27) can be used in the composition ([0007] and [0011]).

6. Claims 1, 9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinohara et al. (U.S. 2002/0055036) in view of Toyobo Co Ltd (JP 07100201), see Schreiber Translation Inc. English Translation (NPL Document U), with evidentiary support from Deshpande et al. (U.S. 2003/0215644), as applied to claims 1 and 9 above.

Shinohara et al. discloses a battery separator membrane for lithium ion batteries ([0004]), in which a “shut-down layer” of polyolefin ([0016]) is combined with a heat-resistant porous layer of, inter alia, polyamideimide resin ([0018]). The gas permeability of the battery membrane separator is disclosed as being 700 sec/100 cc, which lies within in the instant claimed range. Shinohara does not disclose specific polyamideimide materials. Therefore, one of ordinary skill in the polymer film arts would look to other references to find a useful polyamide imide resin. The overall invention of Shinohara et al. is directed towards utilizing heat resistant porous membranes in a field where resistance to heat deformability is problematic ([0005]).

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The porous polyamideimide membrane of Toyobo Co Ltd is disclosed as being designed to be particularly heat resistant (Page 5, L1-6 and Page 6, [0003]) and therefore, because the inventions of both Toyobo Co Ltd and Shinohara et al. are drawn to the field of porous polyamideimide membranes it would have been obvious to one having ordinary skill in the art at the time of the invention to have used the polyamide imide composition of Toyobo Co Ltd. in the separator of Shinohara et al. in order to obtain an appropriate porous, heat-resistant, polyamide imide resin for a battery separator.

Toyobo Co Ltd is also silent as to amide/imide bond ratio (recited in instant claim 9), however, it was known to those having ordinary skill in the art at the time of the invention that the ratio of amide to imide bonds in a polyamide imide resin affects the moisture stability, cost, dielectric constant and solubility in polar solvents of the final product (See Deshpande et al., [0054], for evidence of controllability of imide/amide ratio, and [0072]-[0073], for the corresponding effects). Hence, one having ordinary skill would have adjusted, through routine experimentation, the amide/imide bond ratio in order to optimize the moisture stability of the final product.

### ***Response to Arguments***

7. Applicant's arguments filed on 10/17/2008 are moot in light of the new grounds of rejection which were necessitated by applicant's amendments. Arguments which are still deemed to be relevant to the current rejections are addressed below.

8. Regarding the arguments directed towards the rejection based on Toyobo Co Ltd. and the moisture stability of a polyamideimide resin, applicant asserts that moisture stability would not be a consideration of one having ordinary skill in the art because the instant application has to do

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with non-aqueous lithium ion separators. While the examiner does not agree that moisture stability would not be a consideration (even for an intended non-aqueous final application the separator would potentially be exposed to moisture at some point after its formulation and therefore would be affected by moisture based deterioration to some degree) the examiner would like to point out that nowhere in the instantly elected claims is there any mention of the use of the membrane for lithium ion separators (that invention is non-elected). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant's arguments related to moisture stability could be relevant to the rejections based on Shinohara et al. in view of Toyobo Co Ltd. because Shinohara et al. is directed towards lithium ion separators; however, as explained above, the examiner disagrees that moisture stability would not be a consideration of one having ordinary skill in the art for adjusting the amide/imide bond ratio. The examiner would also like to point out that Deshpande, which is used merely as evidentiary support, discloses numerous other variables which are affected by the amide/imide bond ratio and which one having ordinary skill would have known to controlled. At [0072], Deshpande discloses that polyimide has a higher cost as compared to polyamideimides. At [0054], it is disclosed that polyamideimides have low dielectric constants (though not as low as pure polyimides) and yet advantageously are water soluble (as a result of the amides). At [0072], the water stability is disclosed as being desirable for certain applications (i.e. certain types of forming processes which utilize polar solvents such as those described in Toyobo Co Ltd [0014]). All of these additional considerations would have been relevant to the porous membrane regardless of whether or not it is to be used in a non-aqueous application. Hence in

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addition to moisture stability, one having ordinary skill in the art would have found it obvious to have altered the amide/imide ratio in order to optimize the cost, dielectric constant and/or solvent solubility of the final resin.

Regarding the argument that there is no reason to have used the polyamideimide resin of Toyobo Co Ltd in the invention of Shinohara et al., the examiner notes that Shinohara et al. discloses that polyamidimide resins could be used in the separator ([0018]). Shinohara et al. also discloses that the polyamideimide resin should be heat-resistant ([0018]) which is a property that Toyobo Co Ltd discloses (Page 5, L1-6 and Page 6, [0003]). The argument that the aqueous application of the membrane in Toyobo Co Ltd renders it non-analogous art compared to the disclosure of Shinohara et al. is negated by the fact that both references disclose the use of polyamideimide resins and therefore there was an obvious expectation of success. Hence there is clear disclosure in both prior art references to motivate a combination.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,



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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL B. NELSON whose telephone number is (571) 270-3877. The examiner can normally be reached on Monday through Thursday 6AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MN/

11/12/08

/Carol Chaney/  
Supervisory Patent Examiner, Art Unit 1794